

CLAIMS

What is claimed is:

1. A tunable filter comprising:
 - 5 a polymer waveguide, which provides a wave guiding structure for optical transmissions; and
 - a micro grating, which is installed on the surface of the polymer waveguide to reflect an optical signal of a wavelength transmitted in the waveguide structure to another path;
 - 10 wherein the micro grating is formed by first defining a stripe photoresist pattern on the surface of a polymer film using the interference of two laser beams and then etching the polymer film, the refractive index of the polymer film varies with temperature, the wavelength of the reflected optical signal is determined by tuning the micro grating.
- 15 2. The tunable filter of claim 1, wherein the period of the micro grating is between 400 nm and 600nm.
3. The tunable filter of claim 1, wherein the polymer waveguide is a ridge polymer waveguide.
4. The tunable filter of claim 1, wherein the polymer waveguide is a rib polymer waveguide.
- 20 5. A method for making a tunable filter by preparing a polymer waveguide and a micro grating on the polymer waveguide, the method comprising the steps of:
 - providing a polymer waveguide;
 - forming a polymer film on the surface of the polymer waveguide;

coating a photoresist layer on the surface of the polymer film;
forming a periodic exposure structure on the photoresist layer using the interference of two laser beams;
removing part of the photoresist layer to form a stripe photoresist pattern; and
5 etching the polymer film to form the micro grating.

6. The method of claim 5, wherein the polymer waveguide is a ridge polymer waveguide.

7. The method of claim 5, wherein the polymer waveguide is a rib polymer waveguide.

10 8. The method of claim 5, wherein the step of etching the polymer film to form the micro grating employs the inductively coupled plasma (ICP) etching means to etch the polymer film.

9. The method of claim 5, wherein the period of the micro grating is between 400 nm and 600nm.

15 10. A method for making a tunable filter by preparing a polymer waveguide and a micro grating on the polymer waveguide, the method comprising the steps of:

providing a polymer waveguide, whose surface contains a polymer layer;
forming a polymer film on the surface of the polymer waveguide;
coating a photoresist layer on the surface of the polymer film;
20 forming a periodic exposure structure on the photoresist layer using the interference of two laser beams;
removing part of the photoresist layer to form a stripe photoresist pattern;

etching the polymer film to form the micro grating; and

using photolithography and etching means to form the polymer waveguide on the polymer layer.

11. The method of claim 10, wherein the step of etching the polymer film to form the
5 micro grating employs the inductively coupled plasma (ICP) etching means to etch the polymer film.

12. The method of claim 10, wherein the period of the micro grating is between 400 nm and 600 nm.